DEVICE FOR MAINTAINING TENSION ON LIFT CABLES

CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application No. 60/407,826, filed September 3, 2002.

BACKGROUND OF THE INVENTION

This invention relates to winch cables, and more particularly, a device for maintaining the tension on lift cables to prevent cable entanglement.

In lifting devices, such as boatlifts, a lift cable is wound around a drum which is being rotated by a self-locking gear reduction unit. Thus, the drum effectively becomes a winch spool. Ideally, the cable should wind around the drum evenly without crossing or tangling, which can only be accomplished by maintaining cable tension. The proper winding of the cables is very important for two primary reasons: 1) cross or tangled cables significantly shorten cable life and 2) cross or tangled cables may cut themselves, thereby dropping the load. Thus, it is necessary to maintain tension on the cables.

Typically there are two different cable routes used in the boatlift industry: single part line and two part line. Single part line has a weight, or tensioner, which can be affixed to the cable above the lower members, thus maintaining tension when the lower members are resting on a fixed point or when effectively lightened by bouancy or wave action. However, two part line cannot use the

tensioner as described above because the cable runs through a pulley on the lower members. Thus, cabling problems remain a constant problem in the boatlift industry when using two part cables.

Currently, there are two ways to solve this problem: 1) by using cable keepers and 2) by using weighted snatch blocks. Cable keepers consist of a means of applying tension against the cable and the winder bar. A significant drawback to using this product is that if the boatlift is allowed to run once the weight is off the cable, the cable tends to protrude away from the winder. When the lift is restarted, however, the loop of cable which was formed tends to get caught under the cable keeper, often causing serious damage to the boatlift and the boat.

On the other hand, weighted snatch blocks move the pulley in the lower member to a weighted "Snatch Block" attached to the lower member by means of a cable or chain. Although the weighted snatch blocks will maintain proper cable tension, the overall length of the device and its attachments severely limits the height the boat can be raised to, making the device extremely undesirable to many boaters.

Thus, the present invention will prevent the crossing and tangling of cables by maintaining proper cable tension. In addition, the present invention will not limit the height to which the boat can be raised.

The prior art includes the following United States patents:

Patent No.	Inventor	Filing Date	Issue Date
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3,504,502	Blount	11/06/1967	04/07/1970
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3,778,855	Kariagin *et al.*	12/15/1972	12/18/1973
3,791,229	Litezki	05/24/1972	02/12/1974
4,337,868	Gattu	02/19/1980	07/06/1982
4,589,800	Nasby, Jr.	03/29/1985	05/20/1986
4,641,996	Seal	09/20/1984	02/10/1987
4,686,920	Thomas	11/24/1986	08/18/1987
4,954,011	Stenson	08/01/1988	09/04/1990
4,983,067	Montgomery	03/08/1990	01/08/1991
5,020,463	Franklin *et al.*	12/18/1989	06/04/1991
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5,090,842	Montgomery	01/07/1991	02/25/1992
5,140,923	Wood	03/25/1991	08/25/1992
5,211,124	Reiser	03/06/1992	05/18/1993
5,261,347	Mansfield	07/22/1992	11/16/1993
5,287,821	Godbersen	04/12/1993	02/22/1994
5,390,616	Roth	06/21/1993	02/21/1995
5,593,247	Endres *et al.*	09/07/1995	01/14/1997
5,687,663	Wahlstrand	06/19/1996	11/18/1997
5,701,834	Lyons	08/26/1996	12/30/1997
5,755,529	Follett	05/23/1996	05/26/1998
5,769,568	Parkins *et al.*	01/15/1997	06/23/1998
5,772,360	Wood, II	05/19/1997	06/30/1998
5,803,003	Vickers	01/02/1997	09/08/1998
5,915,877	Sargent *et al.*	06/04/1997	06/29/1999
5,934,826	Mansfield	07/09/1998	08/10/1999
5,947,639	Bishop *et al.*	12/04/1998	09/07/1999
5,957,623	Sargent *et al.*	02/12/1998	09/28/1999
5,988,941	Sargent *et al.*	10/14/1997	11/23/1999
6,006,687	Hillman *et al.*	01/21/1998	12/28/1999
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SUMMARY OF THE INVENTION

The primary object of the present invention is to provide a device for maintaining tension on lift cables with or without the presence of the weight of the item being lifted.

Another object of the present invention is for the prevention of lift cables from crossing and tangling.

A further object of the present invention is to maintain cable tension when the lower lifting beams become bouyant or subject to wave action.

An even further object of the present invention is to maintain cable tension when the lower lifting beams are rested on a fixed point.

Another object of the present invention is to be easily retrofittable to any new or used cable operated boat lift.

Another object of the present invention is to maintain cable tension when installing cables on a new boat lift.

A further object of the present invention is to maintain cable tension when servicing an existing boat lift.

The present invention fulfills the above and other objects by providing a device for maintaining tension on lift cables which has a pulley and a weight or spring. The pulley will permit the cables to change direction while the weight or spring will be of sufficient size to maintain cable tension when the cable is

attached to it. The cable is attached to the weight or spring and is adjustable. When the weight of the boat or cradle is removed from the boatlift, the weight or spring pulls down on the end of the cable, thereby maintaining tension. Because the boat or cradle weight is heavier than the weight attached to the machine, tension will still be maintained when the boat or cradle is replaced on the boatlift. In addition, the present invention can be used onto an existing boatlift by mounting it to the existing boatlift's top beam.

The above and other objects, features, and advantages of the present invention should become even more readily apparent to those skilled in the art upon a reading of the following detailed description in conjunction with the drawings wherein there is shown and described illustrative embodiments of the invention.

BRIEF DESCRIPTION OF DRAWINGS

This invention is described by appended claims in relation to a description of a preferred embodiment with reference to the following drawings which are explained briefly as follows:

FIG. 1 is a side view of the present invention installed on a boatlift using a weight tension means;

FIG. 2 is a cross sectional view along the line 2-2 of the embodiment of **FIG. 1**;

FIG. 3 is a side view of the present invention installed on a boatlift using a spring tension means and the cradle beam is resting; and

FIG. 4 is a side view of the present invention installed on a boatlift using a spring tension means and the cradle beam is suspended.

DESCRIPTION OF PREFERRED EMBODIMENT

Listed numerically below with reference to the drawings are terms used to describe features of this invention. These terms and numbers assigned to them designate the same features throughout this description.

1. winder bar
2. driveshaft bearing
3. top beam
4. cable
5. tag end of cable
6. vertical piling
7. cradle beam
8. bottom
9. pulley
10. weight
11. stop
12. winch spool
13. cradle
14. windlass
15. spring

With reference to **FIG. 1**, a side view of the present invention installed on a boatlift where the tension means applied is a weight **10**. Although one end of the cradle beam **7** is resting on the bottom and the other end of the cradle beam **7** is suspended, tension on the cables **4** is maintained at both ends by using a weight **10**. The stationary top beam **3** of the boatlift is supported by vertical pilings **6**. The winderbar **1** is attached to the top beam **3** by using driveshaft bearings **2**. The tag ends of a cable **5** are attached to the winderbar **1** so that when the

winderbar **1** rotates, a winch spool **12** is created so the cables **4** wrap around the winderbar **1** without overlapping. The cables **4** that are not wrapped continue downward through a hole in the top beam **3** to slide under the windlass **14** affixed to a cradle **13**. The cable **4** then continues upward so as to feed over the pulley **9** which is affixed to a stop **11**, preferably by screws. The stop **11** houses the pulley **9** and is affixed to the top beam **3**, preferably by bolts. A weight **10** is attached to the end of the cables **4.** When the cradle beam **7** is resting on the bottom **8**, the weight **10** is not pressed against the stop **11** although tension is still maintained in the cables **4**. When the cradle beam **7** is suspended, the weight **10** rises to press against the stop **11** to maintain tension in the cables **4**.

In **FIG. 2,** a cross sectional view along the line 2-2 of the embodiment of **FIG. 1** is shown. The cable **4**, attached to the winch spool **12** on one end and having a weight **10** attached to the other, is fed over a pulley **9** located in the stop **11**. Both the pulley **9** and the stop **11** are attached to the top beam **3**, preferably by using bolts.

Referring to **FIG. 3**, the present invention installed on a boatlift is shown where the tension means applied is a spring **15** and the cradle beam **7** is resting on the bottom **8**. As in the previous figures, the tag end of the cable **5** is attached to the windbar **1** so that when the winderbar **1** rotates, a winch spool **12** is created so the cables **4** wrap around the winderbar **1** without overlapping. The

cables **4** that are not wrapped continue downward through a hole in the top beam **3** to slide under the windlass **14** affixed to a cradle **13**. When using a spring **15** tension means, however, the opposite end of the cable **4** is attached to a spring **15,** rather than a weight **10.** The opposite end of the spring **15** is then attached to a stationary object, such as the top beam **3**, preferably by using bolts. When the cradle beam **7** is resting on the bottom **8**, the spring **15** is stretched from its coiled position so as to maintain tension in the cable **4**.

With reference to **FIG. 4**, the present invention installed on a boatlift is shown where the tension means applied is a spring **15** and the cradle beam **7** is suspended. The spring **15** returns to its coiled position to maintain tension in the cables **4**.

It is to be understood that while a certain form of the invention is illustrated, it is not to be limited to the specific form or arrangement of parts herein described and shown. It will be apparent to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown and described in the specification and drawings.